Having thus defined the invention, the following is claimed:

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- 1. An electric arc welding system for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveforms have a positive portion and a negative portion and a cycle period of about 10-20 ms, a first timing circuit for determining the push time of a sustained maintenance of opposite polarity between said waveforms and a waveform adjusting circuit to limit said push time to less than about 5.0 ms.
- 2. An electric arc welding system as defined in claim 1 wherein said AC waveforms are generally sinusoidal.
- 3. An electric arc welding system as defined in claim 2 including a second timing circuit for determining the pull time of a sustained maintenance of the same polarity between said waveforms and a second waveform adjusting circuit to limit said pull time to less than about 5.0 ms.

- 4. An electric arc welding system as defined in claim 1 including a second timing circuit for determining the pull time of a sustained maintenance of the same polarity between said waveforms and a second waveform adjusting circuit to limit said pull time to less than about 5.0 ms.
- 5. An electric arc welding system as defined in claim 4 wherein one of said waveforms is generally a square AC waveform.
- 6. An electric arc welding system as defined in claim 1 wherein one of said waveforms is generally a square AC waveform.
- 7. An electric arc welding system as defined in claim 4 wherein both of said waveforms are generally a square AC waveform.
- 8. An electric arc welding system as defined in claim 1 wherein both of said waveforms are generally a square AC waveform.
- 9. An electric arc welding system as defined in claim 4 wherein one of said waveforms is a pulse AC waveform.
- 10. An electric arc welding system as defined in claim 1 wherein one of said waveforms is a pulse AC waveform.

11. An electric arc welding system for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveforms have a positive portion and a negative portion and a cycle period of about 10-20 ms, a timing circuit for determining the pull time of a sustained maintenance of same polarity between said waveforms and a waveform adjusting circuit to limit said pull time to less than about 5.0 ms.

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- 12. An electric arc welding system as defined in claim 11 wherein said AC waveforms are generally sinusoidal.
- 13. An electric arc welding system as defined in claim 12 wherein one of said waveforms is generally a square AC waveform.
- 14. An electric arc welding system as defined in claim 11 wherein one of said waveforms is generally a square AC waveform.

- 15. An electric arc welding system as defined in claim 12 wherein both of said waveforms are generally a square AC waveform.
- 16. An electric arc welding system as defined in claim 11 wherein both of said waveforms are generally a square AC waveform.
- 17. An electric arc welding system as defined in claim 12 wherein one of said waveforms is a pulse AC waveform.
- 18. An electric arc welding system as defined in claim 11 wherein one of said waveforms is a pulse AC waveform.
- 19. An electric arc welding method for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveform have a positive portion and a negative portion and a cycle period of about 10-20 ms, said method comprising:

- (a) determining the push time of a sustained maintenance of opposite polarity between said waveforms; and,
 - (b) adjusting said waveforms to limit said push time to less than about 5.0 ms.
- 20. An electric arc welding method as defined in claim 19 wherein said AC waveforms are generally sinusoidal.
 - 21. An electric arc welding method as defined in claim 20 further including:
- (c) determining the pull time of a sustained maintenance of the same polarity between said waveforms; and,
 - (d) adjusting said waveforms to limit said pull time to less than about 5.0 ms.
- 22. An electric arc welding method as defined in claim 19 including a second timing circuit for determining the pull time of a sustained maintenance of the same polarity between said waveforms and a second waveform adjusting circuit to limit said pull time to less than about 5.0 ms.
- 23. An electric arc welding method as defined in claim 22 wherein one of said waveforms is generally a square AC waveform.
- 24. An electric arc welding method as defined in claim 19 wherein one of said waveforms is generally a square AC waveform.

- 25. An electric arc welding method as defined in claim 22 wherein both of said waveforms are generally a square AC waveform.
- 26. An electric arc welding method as defined in claim 19 wherein both of said waveforms are generally a square AC waveform.
- 27. An electric arc welding method as defined in claim 22 wherein one of said waveforms is a pulse AC waveform.
- 28. An electric arc welding method as defined in claim 19 wherein one of said waveforms is a pulse AC waveform.
- 29. An electric arc welding method for creating a first AC welding arc with a first current waveform between a first electrode and a workpiece by a first power supply and a second AC welding arc with a second current waveform between a second electrode and a workpiece by a second power supply as said first and second electrodes are moved in unison along a welding path, said first and second power supply each comprising an high speed switching inverter creating its waveform by a number of current pulses occurring at a frequency of at least 18 kHz with the magnitude of each current pulse controlled by a wave shaper and the polarity of said waveforms controlled by a signal, wherein said first and second AC waveforms have a positive portion and a negative portion and a cycle period of about 10-20 ms, said method comprising:

- (a) determining the pull time of a sustained maintenance of same polarity between said waveforms; and,
 - (b) adjusting said waveforms to limit said pull time to less than about 5.0 ms.
- 30. An electric arc welding method as defined in claim 29 wherein said AC waveforms are generally sinusoidal.
- 31. An electric arc welding method as defined in claim 30 wherein one of said waveforms is generally a square AC waveform.
- 32. An electric arc welding method as defined in claim 29 wherein one of said waveforms is generally a square AC waveform.
- 33. An electric arc welding method as defined in claim 30 wherein both of said waveforms are generally a square AC waveform.
- 34. An electric arc welding method as defined in claim 29 wherein both of said waveforms are generally a square AC waveform.
- 35. An electric arc welding method as defined in claim 30 wherein one of said waveforms is a pulse AC waveform.

- 36. An electric arc welding system as defined in claim 19 wherein one of said waveforms is a pulse AC waveform.
- 37. An electric arc welding method as defined in claim 29 wherein the welding process is submerged arc.
- 38. An electric arc welding method as defined in claim 19 wherein the welding process is submerged arc.
- 39. An electric arc welding system as defined in claim 11 wherein said system is a submerged arc system.
- 40. An electric arc welding system as defined in claim 1 wherein said system is a submerged arc system.